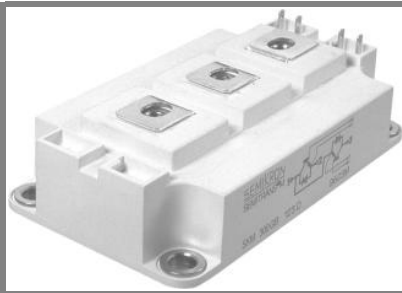


# SKM 400GB128D...



**SEMITRANS<sup>®</sup> 3**

## SPT IGBT Module

**SKM 400GB128D**

**SKM 400GAL128D**

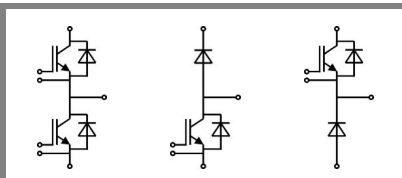
**SKM 400GAR128D**

### Features

- Homogeneous Si
- SPT = Soft-Puch-Through technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_C$

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders at  $f_{sw}$  up to 20kHz



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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200	V
$I_C$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	565 A
		$T_c = 80^\circ\text{C}$	400 A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	600	A
$V_{GES}$		$\pm 20$	V
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10	$\mu\text{s}$

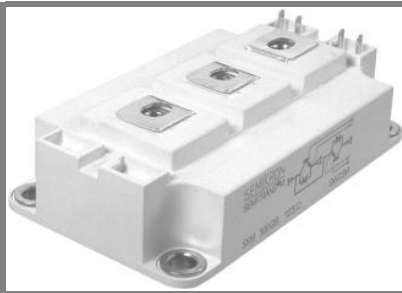
Inverse Diode		$T_{case} = 25^\circ\text{C}$	
Symbol	Conditions	Values	Units
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	390 A
		$T_{case} = 80^\circ\text{C}$	260 A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	2880 A

Freewheeling Diode		$T_{case} = 25^\circ\text{C}$	
Symbol	Conditions	Values	Units
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	390 A
		$T_{case} = 80^\circ\text{C}$	260 A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}; \sin$	$T_j = 150^\circ\text{C}$	2880 A

Module		$T_c = 25^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	min.	typ.
$I_{t(RMS)}$			500
$T_{vj}$		- 40 ... + 150	$^\circ\text{C}$
$T_{stg}$		- 40 ... + 125	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.		4000

Characteristics		$T_c = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	min.	typ.	max.
<b>IGBT</b>				
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 12\text{ mA}$	4,5	5,5	6,45
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,2	0,6
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1	1,15
		$T_j = 125^\circ\text{C}$	0,9	1,05
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	3	4
		$T_j = 125^\circ\text{C}$	4	5
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,9	2,35
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,1	2,55
$C_{res}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		26
$C_{oes}$				3
$C_{res}$				3
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$		3700	
$R_{Gint}$	$T_j = 25^\circ\text{C}$		1,25	
$t_{d(on)}$	$R_{Gon} = 4,7\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 300\text{ A}$		110
$t_r$				60
$E_{on}$	$R_{Goff} = 4,7\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$		32
$t_{d(off)}$				800
$t_f$				60
$E_{off}$				31
$R_{th(j-c)}$	per IGBT			0,055

# SKM 400GB128D...



**SEMITRANS<sup>®</sup> 3**

## SPT IGBT Module

**SKM 400GB128D**

**SKM 400GAL128D**

**SKM 400GAR128D**

### Features

- Homogeneous Si
- SPT = Soft-Puch-Through technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_c$

### Typical Applications

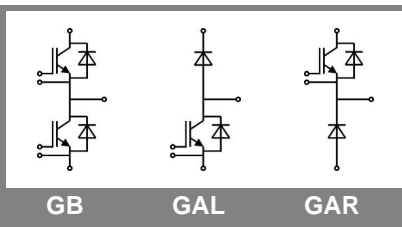
- AC inverter drives
- UPS
- Electronic welders at  $f_{sw}$  up to 20kHz

### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,8		V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$	1,1	1,2	V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$	3	4,3	m $\Omega$
$I_{RRM}$	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	176		A
$Q_{rr}$	$di/dt = 2400 \text{ A}/\mu\text{s}$		40		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		16		mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
<b>FWD</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,8		V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$	1,1	1,2	V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$	3	4,3	V
$I_{RRM}$	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	176		A
$Q_{rr}$	$di/dt = 2400 \text{ A}/\mu\text{s}$		40		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		16		mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
<b>Module</b>					
$L_{CE}$			15	20	nH
$R_{CC+EE}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,35		m $\Omega$
		$T_{case} = 125 \text{ }^\circ\text{C}$	0,5		m $\Omega$
$R_{th(c-s)}$	per module			0,038	K/W
$M_s$	to heat sink M6		3	5	Nm
$M_t$	to terminals M6		2,5	5	Nm
w				325	g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

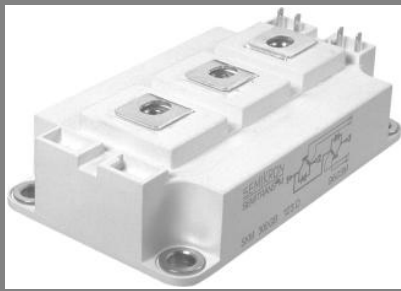
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**SEMITRANS<sup>®</sup> 3**

## SPT IGBT Module

**SKM 400GB128D**

**SKM 400GAL128D**

**SKM 400GAR128D**

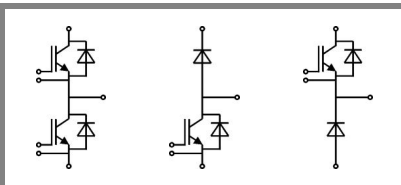
### Features

- Homogeneous Si
- SPT = Soft-Puch-Through technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_c$

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders at  $f_{sw}$  up to 20kHz

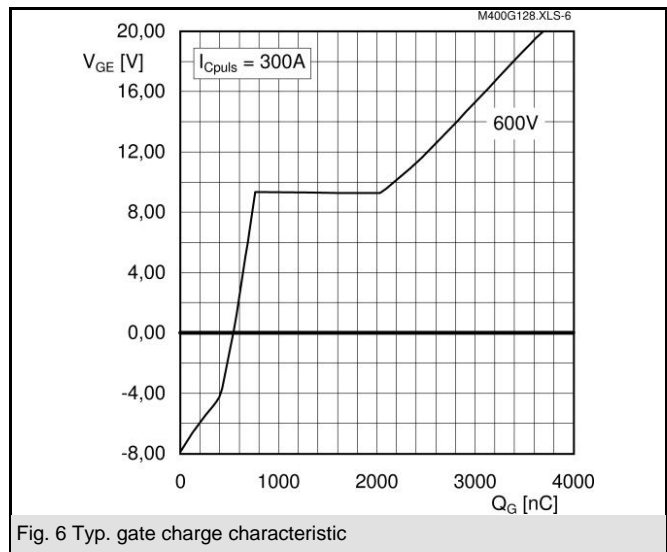
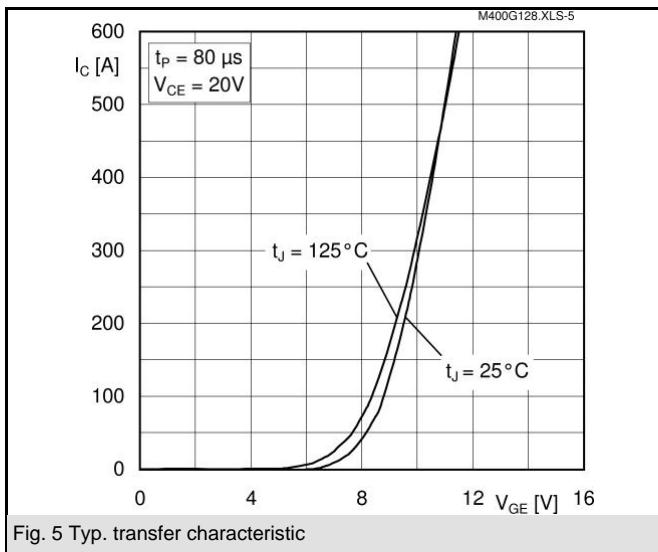
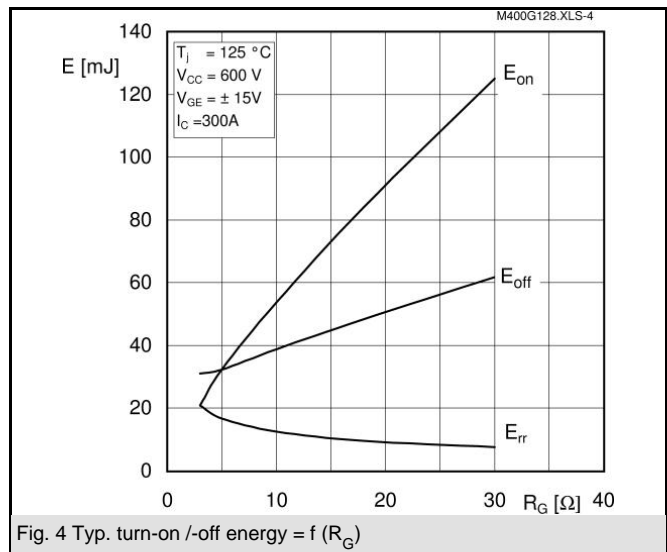
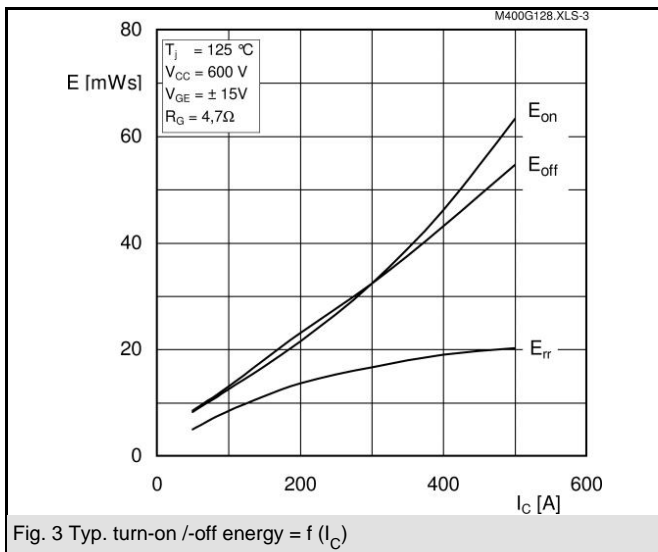
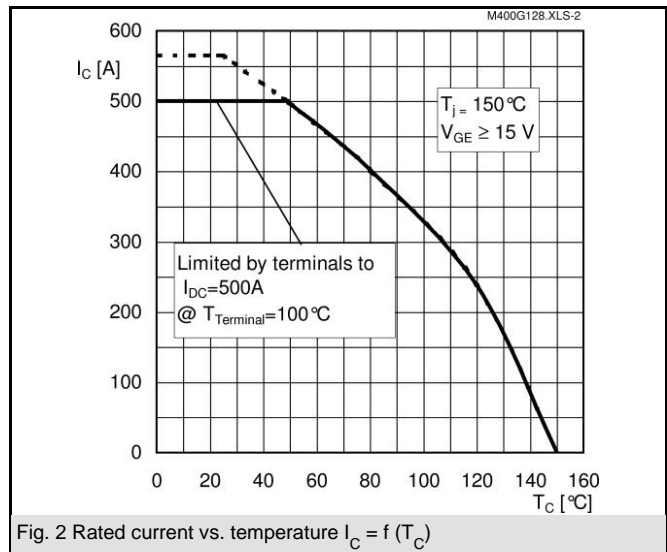
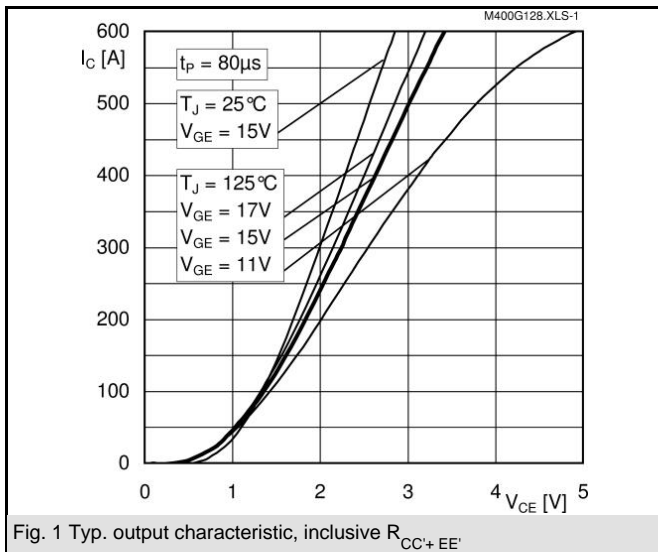
$Z_{th}$		Values	Units
Symbol	Conditions		
$Z_{th(j-c)I}$			
$R_{\theta}$	$i = 1$	37	mk/W
$R_{\theta}$	$i = 2$	14	mk/W
$R_{\theta}$	$i = 3$	3,45	mk/W
$R_{\theta}$	$i = 4$	0,55	mk/W
$\tau_{\theta}$	$i = 1$	0,0744	s
$\tau_{\theta}$	$i = 2$	0,0078	s
$\tau_{\theta}$	$i = 3$	0,0024	s
$\tau_{\theta}$	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
$R_{\theta}$	$i = 1$	75	mk/W
$R_{\theta}$	$i = 2$	38	mk/W
$R_{\theta}$	$i = 3$	10,6	mk/W
$R_{\theta}$	$i = 4$	1,4	mk/W
$\tau_{\theta}$	$i = 1$	0,0386	s
$\tau_{\theta}$	$i = 2$	0,0201	s
$\tau_{\theta}$	$i = 3$	0,001	s
$\tau_{\theta}$	$i = 4$	0,003	s

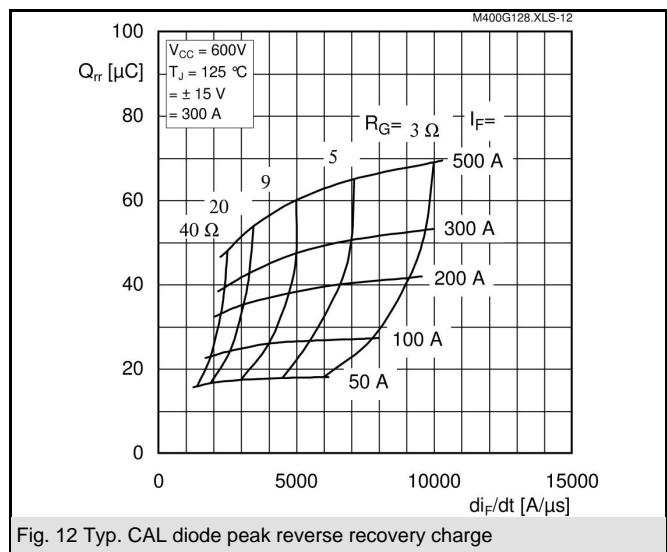
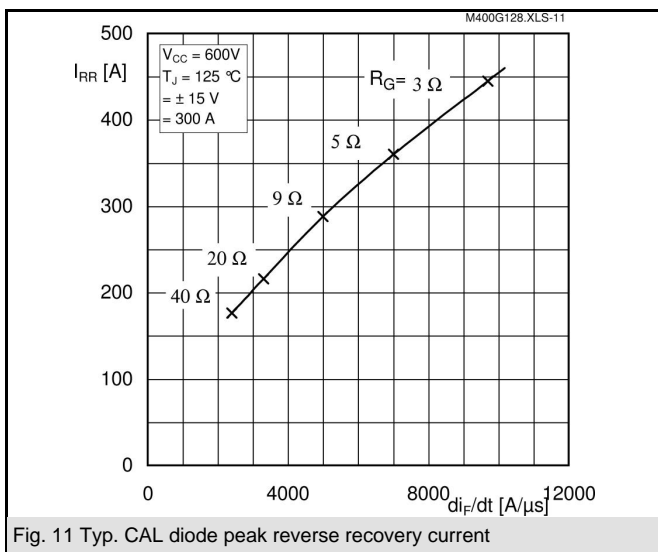
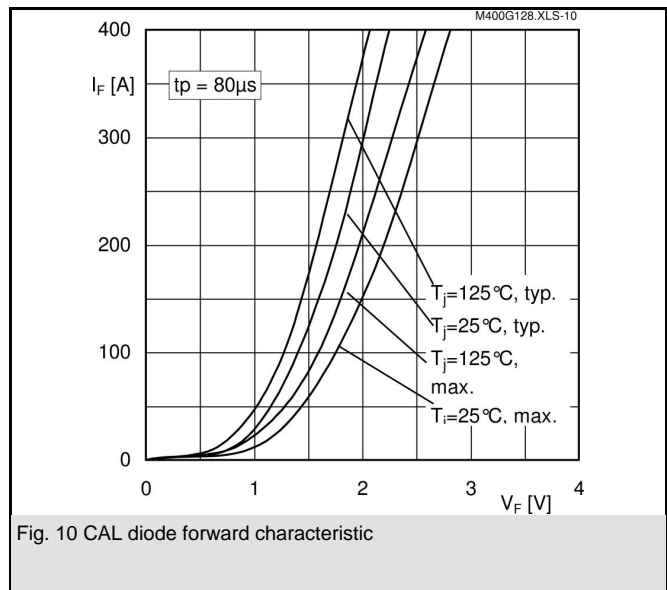
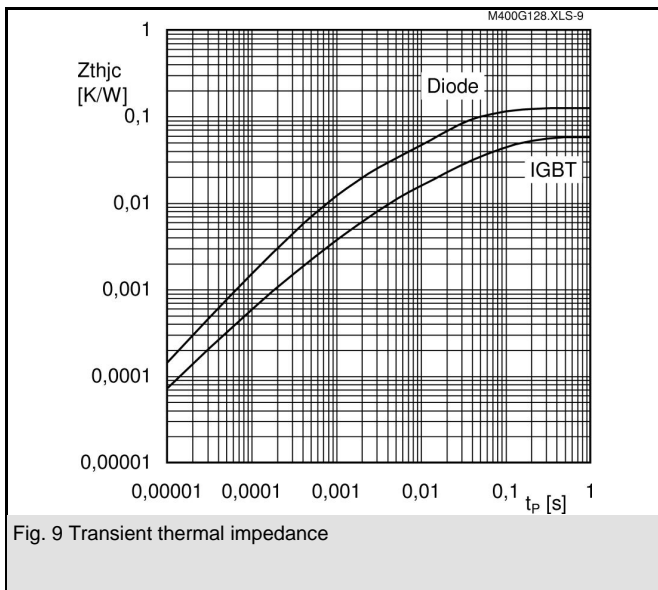
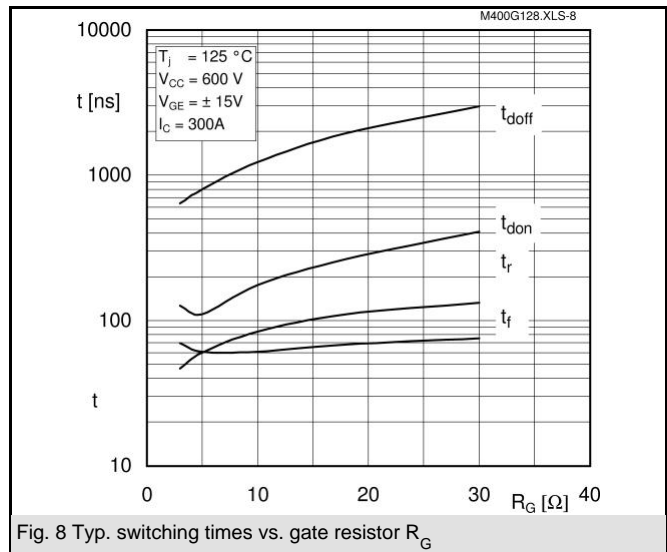
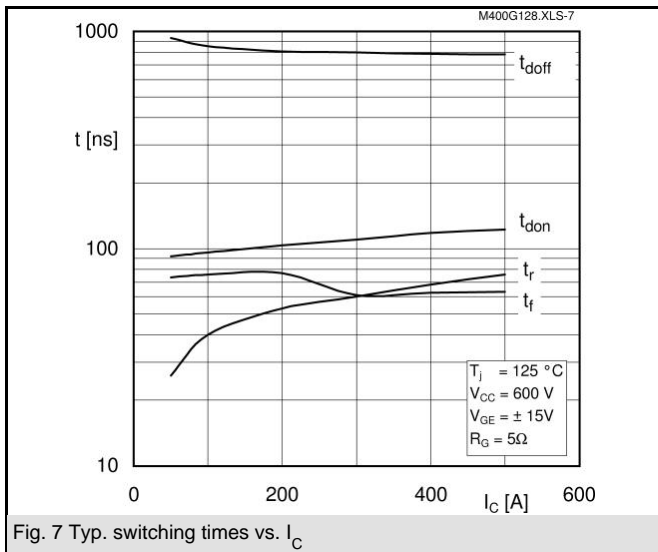


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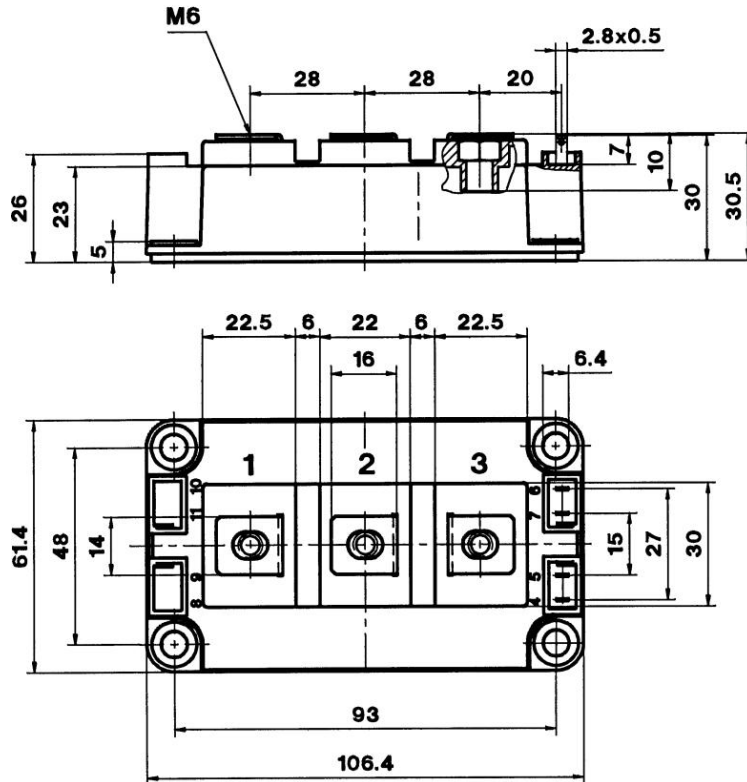


# SKM 400GB128D...

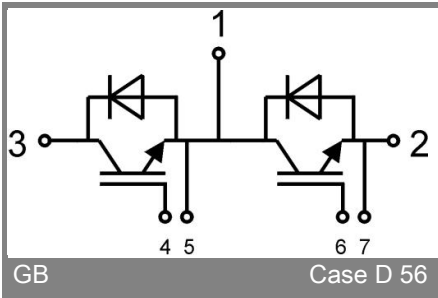
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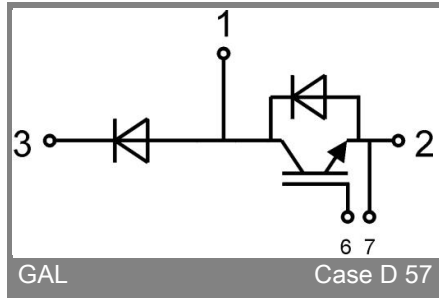


Case D 56



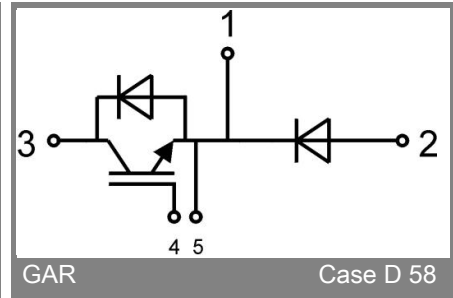
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Case D 56



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Case D 57



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Case D 58